Powered Industrial Trucks

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1. Introduction

1.1 Incidence of Lift-Truck Injuries

Each year, it is estimated that more than 37,000 forklift-related injuries occur in U.S. industry (Professional Safety, January 1993). Injuries involve employees being struck by lift trucks or falling while standing or working from elevated pallets and tines. Many employees are injured when lift trucks are inadvertently driven off loading docks or when the lift falls between a dock and an unchocked trailer. For each employee injured, there are probably numerous incidents that are unnoticed or unreported to supervision. All mishaps--no matter how small--cost. Most incidents also involve property damage. Damage to overhead sprinklers, racking, pipes, walls, machinery, and various other equipment occurs all too often. In fact, millions of dollars are lost in damaged equipment, destroyed products, or missed shipments. Unfortunately, a majority of employee injuries and property damage can be attributed to lack of procedures, insufficient or inadequate training, and lack of safety-rule enforcement.

1.2 Causes of Lift-Truck Injuries

Unsafe Acts

- Inadequately trained maintenance personnel and inspectors and operators.
- Wrong truck selected for the job (too big, too small, wrong for hazardous location).
- Hurrying, taking shortcuts, not paying attention, fatigue, boredom, or not following the rules.
- Overloading trucks.
- Improper selection and installation of dockboards and bridge plates.

Unsafe Conditions

- Forks or other load-handling attachments cracked or bent.
- Gouges or large chunks missing from solid tires.
- Blind corners.
- Leaky connectors and hydraulic cylinders.
- Too much free play in the steering.
- Unsafe refueling or recharging practices.

1.3 Prevention Overview

Whether the operator is new to the job or experienced he or she should visually check forklift trucks every day. Good prevention consists mainly of proper maintenance, trained operators, and adherence to established safety procedures. Special attention should be given to the following areas:

- Proper truck selection (size, load-carrying capacity, hazardous location).
- Condition and inflation of pressure lines.
- Battery, lights, and warning devices.
- Controls, including lift and tilt system and limit switches.
- Brakes and steering mechanism.
- Fuel system.

1.4 Scope

This contains safety information relating to fire protection, design, maintenance, and use of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines. It does not apply to compressed-air or nonflammable, compressed-gas-operated industrial trucks, farm vehicles, or vehicles intended primarily for earth moving or over-the-road hauling.

1.5 Basic Terms

Attachments--Devices (other than conventional forks or load backrest extensions) mounted permanently or temporarily on the elevating mechanism of the truck. Popular types include fork extensions, clamps, booms, rams, baskets, and personnel platforms.

Capacity--Used to designate the weight-handling ability of a particular truck as equipped.

Dockboard--A portable or fixed device for spanning the gap or compensating for the differences in the level between loading platform and carrier.

Environment--Locations are classified as hazardous or nonhazardous when considering the type of industrial truck required.

Forklift Truck--A self-loading truck, equipped with load carriage and forks for transporting and tiering loads.

Forks--Horizontal, tine-like projections, normally suspended from the carriage, that engage and support loads.

Operator--A trained and authorized person who controls any function(s) of a powered industrial truck.

Tiering--The process of placing one load on or above another.

2. Standards and Codes

Organization	Standard	Title
OSHA	29 CFR 1910.178	Powered industrial trucks
OSHA	29 CFR 1910.1000	Air contaminants
ANSI	B56.1-1988	American national standard for powered industrial trucks
NFPA	NFPA No. 30-1969	NFPA flammable and combustible liquids code
NFPA	NFPA No. 58-1969	NFPA storage and handling of liquefied petroleum gases
NFPA	NFPA No. 505-1969	Powered industrial trucks
UL	583	Standard for safety for electric or battery-powered industrial trucks
UL	558	Standard for safety for internal combustion or engine powered industrial trucks
ANSI/NFPA	30-1987	Flammable and combustible liquid code
ANSI/NFPA	58-1986	Storage and handling of liquefied petroleum gases
ANSI/NFPA	505-1987	Fire safety standard for powered industrial trucks-type designations, areas of use, maintenance and operation

OSHA = Occupational Safety and Health Administration
ANSI = American National Standards Institute
NFPA = National Fire Protection Associiation
UL = Underwriters Laboratory

3. Protective Devices

The use of protective devices is an important factor in safe forklift operation. Safety specialists can assist supervisors in determining what protective devices are necessary. Although forklifts need not be equipped alike, there are some similarities such as lights. Also, manufacturers are required by federal standards to equip forklifts with certain mandatory features such as back-up alarms. The requirement exists to warn others when the truck is reverse. Some other protective devices include:

- Overhead protection to guard the operator from falling objects.
- Wheel plates to protect the operator from objects picked up and thrown by tires.
- On-board fire extinguishers.
- Horns to warn others when the truck is moving forward.

Other protective devices that might be seen in the work area or specifically designed for the operator include:

- Signs--such as stop, caution, danger, and speed limits--to inform operators of conditions.
- Gloves and safety shoes.
- Eyewash stations.
- Concave mirrors.
- Eye protection devices.
- Hardhats to protect operators when there is an overhead hazard.

4. Work Practices

4.1 Selection and Inspection of Trucks

The proper truck (size, load capacity, and use) must be selected and inspected to ensure that all controls and safety features are working properly.

4.2 Maintenance and Repair of Trucks

It is required that trained and authorized personnel maintain and inspect fork trucks. All work should be done in accordance with the manufacturer's specifications. Because of everyday use of these vehicles, it is particularly important for personnel to follow the maintenance, lubrication, and inspection schedules. Special attention should be given to forklift control and lifting features such as brakes, steering, lift overload devices, and tilt mechanism.

4.3 Safety Tips for Operating Forklifts

Safe Operation. Operators must follow all safety rules related to speed, parking, fueling, loading, and moving loads. While the forklift is in operation keep the forks low with the mast tilted slightly back. Too tall or "top-heavy" loads can change the forklift's center of gravity and cause it to tip over. Follow safe speed limits. Loaded forklifts should travel at low speeds. Without loads, forklifts are not weighted and are especially unstable. Avoid sharp turns. Forklifts can turn over if turns are made too fast. When parking on a hill, always chock the forklift's wheels, lower the tines, and set the parking brake (see Figure 1). Also, to avoid tipping, always carry loads up a grade and back down ramps. Never turn on grades. Keep safe visibility. If a load blocks forward vision, drive backwards. Always use the horn at intersections. Be cautious around uneven surfaces; chuckholes and other uneven ground can cause forklifts to tip.

Co-worker safety. Never carry hitchhikers--they can easily fall off and become injured. If co-workers are on a safety platform, always ensure that the platform is securely attached to the forklift and personnel are wearing proper personal protective equipment (e.g., hardhat and safety belt). Never travel with co-workers on the platform. Watch out for overhead obstructions.

Pedestrian safety. Pedestrians working nearby should be sure to keep a safe distance from forklifts. That means staying clear of the forklift's turning radius and making sure the driver knows where you are.

5. Training

(l) Operator training. [29 CFR 1910.178(l)]

(1) Safe operation.

(i) The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).

(ii) Prior to permitting an employee to operate a powered industrial truck (except for training purposes), the employer shall ensure that each operator has successfully completed the training required by this paragraph (l), except as permitted by paragraph (l)(5).

(2) Training program implementation.

(i) Trainees may operate a powered industrial truck only:

(A) Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and

(B) Where such operation does not endanger the trainee or other employees.

(ii) Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

(iii) All operator training and evaluation shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence.

(3) Training program content. Powered industrial truck operators shall receive initial training in the following topics, except in topics which the employer can demonstrate are not applicable to safe operation of the truck in the employer's workplace.

(i) Truck-related topics:
(A) Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate;
(B) Differences between the truck and the automobile;
(C) Truck controls & instrumentation: where they are located, what they do, and how they work;
(D) Engine or motor operation;
(E) Steering and maneuvering;
(F) Visibility (including restrictions due to loading);
(G) Fork and attachment adaptation, operation, and use limitations;
(H) Vehicle capacity;
(I) Vehicle stability;
(J) Any vehicle inspection and maintenance that the operator will be required to perform;
(K) Refueling and/or charging and recharging of batteries;
(L) Operating limitations;
(M) Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

(ii) Workplace-related topics:
(A) Surface conditions where the vehicle will be operated;
(B) Composition of loads to be carried and load stability;
(C) Load manipulation, stacking, and unstacking;
(D) Pedestrian traffic in areas where the vehicle will be operated;
(E) Narrow aisles and other restricted places where the vehicle will be operated;

(F) Hazardous (classified) locations where the vehicle will be operated;
(G) Ramps and other sloped surfaces that could affect the vehicle's stability;
(H) Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust;
(I) Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

(iii) The requirements of this section.

(4) Refresher training and evaluation.

(i) Refresher training, including an evaluation of the effectiveness of that training, shall be conducted as required by paragraph (l)(4)(ii) to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely.

(ii) Refresher training in relevant topics shall be provided to the operator when:
(A) The operator has been observed to operate the vehicle in an unsafe manner;
(B) The operator has been involved in an accident or near-miss incident;
(C) The operator has received an evaluation that reveals that the operator is not operating the truck safely;
(D) The operator is assigned to drive a different type of truck; or
(E) A condition in the workplace changes in a manner that could affect safe operation of the truck.

(iii) An evaluation of each powered industrial truck operator's performance shall be conducted ***at least once every three years.***

(5) Avoidance of duplicative training. If an operator has previously received training in a topic specified in paragraph (l)(3) of this section, and such training is appropriate to the truck and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the truck safely.

(6) Certification. The employer shall certify that each operator has been trained and evaluated as required by this paragraph (l). The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

(7) Dates. The employer shall ensure that operators of powered industrial trucks are trained, as appropriate, by the dates shown in the following table.

If the employee was hired:	**The initial training and evaluation of that employee must be completed:**
Before December 1, 1999.....	By December 1, 1999.
After December 1, 1999.....	Before the employee is assigned to operate a powered industrial truck.

(8) Appendix A to this section provides non-mandatory guidance to assist employers in implementing this paragraph (l). This appendix does not add to, alter, or reduce the requirements of this section.

Driving Skills Evaluations

A key dimension of operator training is driver certification. Operators should be required to demonstrate their skills. Adequate completion of skills tests (recorded on rating sheets similar to those in Appendix B) demonstrates that the operator (1) knows and understands the unit's functional features, (2) is familiar with overall departmental safety rules and can identify specific safety factors at a dock and battery recharge station, and (3) demonstrates overall driving skills. Testing can be administered on the job during the employee's normal work day.

Hazards and Effects

Many hazards associated with the operation of powered industrial trucks are the result of common operator mistakes. For instance, collisions between trucks and stationary objects often occur while trucks are backing up--usually while turning and maneuvering. Unless care is exercised, operators can cause damage to overhead fixtures (e.g., sprinklers, piping, electrical conduits) while traveling and maneuvering under them.

Accidents often occur when an operator leaves a truck so that it obstructs a passageway and an unauthorized (untrained) worker tries to move it. Other common hazards include carrying unstable loads, tipping over trucks, dropping loads on operators or others, running into or over others, and pinning others between the truck and fixed objects.

Unauthorized passengers are often seriously injured from falling off trucks. Unless space is provided, do not allow passengers to ride on the trucks.

Dangerous misuse of trucks includes bumping skids, moving piles of material out of the way, moving heavy objects by means of makeshift connections, and pushing other trucks. All these activities can cause accidents or injuries; they also indicate poor operator training.

Factors that can influence stability (resistance to overturning) must be considered.

Appendix A--Stability of Powered Industrial Trucks

(Non-mandatory Appendix to Paragraph (l) of This Section)

A-1. Definitions. The following definitions help to explain the principle of stability:

Center of gravity is the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Counterweight is the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

Fulcrum is the truck's axis of rotation when it tips over.

Grade is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).

Lateral stability is a truck's resistance to overturning sideways.

Line of action is an imaginary vertical line through an object's center of gravity.

Load center is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

Longitudinal stability is the truck's resistance to overturning forward or rearward.

Moment is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

Track is the distance between the wheels on the same axle of the truck.

Wheelbase is the distance between the centerline of the vehicle's front and rear wheels.

A-2. General.

A-2.1. Determining the stability of a powered industrial truck is simple once a few basic principles are understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped).

A-2.2. The ``stability triangle,'' used in most stability discussions, demonstrates stability simply.

A-3. Basic Principles.

A-3.1. Whether an object is stable depends on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This principle can be seen in the way a see-saw or teeter-totter works: that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and it will not move. However, if there is a greater moment at one end of the device, the device will try to move downward at the end with the greater moment.

A-3.2. The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematic product of the load moment(the distance from the front wheels, the approximate point at which the vehicle would tip forward) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

A-4. The Stability Triangle.

A-4.1. Almost all counterbalanced powered industrial trucks have a three-point suspension system, that is, the vehicle is supported at three points. This is true even if the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. Figure 1 depicts the stability triangle.

A-4.2. When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/ load combination falls outside the stability triangle, the vehicle is unstable and may tip over.

A-5. Longitudinal Stability.

A-5.1. The axis of rotation when a truck tips forward is the front wheels' points

of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. When a truck is stable, the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load moment slightly exceeds the vehicle-moment, the truck will begin to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in loss of steering control. If the load-moment greatly exceeds the vehicle moment, the truck will tip forward.

A-5.2. To determine the maximum safe load-moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called the load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. Trucks with a capacity of 30,000 pounds or less are normally rated at a given load weight at a 24-inch load center. Trucks with a capacity greater than 30,000 pounds are normally rated at a given load weight at a 36- or 48-inch load center. To safely operate the
vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.

A-5.3. Although the true load-moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculating the maximum allowable load- moment using the load-center distance always provides a lower load- moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center of gravity is greater than 24 inches) or that have an offset center of gravity, etc., a maximum allowable load-moment should be calculated and used to determine whether a load can be safely handled. For example, if an operator is operating a 3000 pound capacity truck (with a
24-inch load center), the maximum allowable load-moment is 72,000 inch-pounds (3,000 times 24). If a load is 60 inches long (30-inch load center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

A-6. Lateral Stability.

A-6.1. The vehicle's lateral stability is determined by the line of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over. Refer to Figure 2.

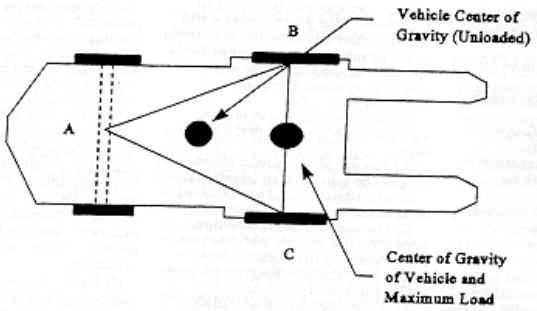
A-6.2. Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.

A-7. Dynamic Stability.

A-7.1. Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc., are important stability considerations.

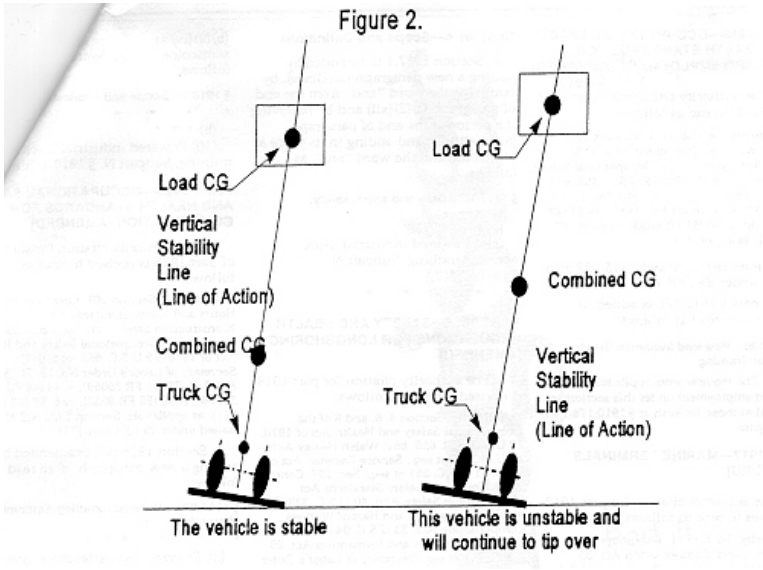
A-7.2. When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics.
For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.

Figure 1.



Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.



PART 1926--OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR CONSTRUCTION [AMENDED]

1. The authority citation for subpart O of part 1926 is revised to read as follows:

Authority: Section 107, Construction Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), or 6-96 (62 FR 111), as applicable. Section 1926.602 also issued under 29 CFR part 1911.

2. Section 1926.602 is amended by adding a new paragraph (d) to read as follows:

Sec. 1926.602 Material Handling Equipment [Amended]

(d) Powered industrial truck operator training.

Note: The requirements applicable to construction work under this paragraph are identical to those set forth at Sec. 1910.178(l) of this chapter.
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Truck Type Designations

- **D**--Units that have minimum accepted safeguards against fire hazards.
- **DS**--Diesel-powered units with additional safeguards to the exhaust, fuel, and electrical systems. These units may be used in some locations where a D unit may not be considered suitable.
- **DY**--Diesel-powered units that have all the safeguards of the DS units and, in addition, do not have any electrical equipment including the ignition, and are equipped with temperature limitation features.
- **E**--Electrically powered units that have minimum acceptable safeguards against inherent fire hazards.
- **ES**--Electrically powered units that, in addition to all of the requirements for the E units, have additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures. These units may be used in some locations where the use of an E unit may not be considered suitable.
- **EE**--Electrically powered units that have, in addition to all of the requirements for the E and ES units, the electric motors and all other electrical equipment completely enclosed. In certain locations the EE unit may be used where the use of an E and ES unit may not be considered suitable.
- **EX**--Electrically powered units that differ from the E, ES, or EE units in that the electrical fittings and equipment are designed, constructed and assembled so that the units may be used in certain atmospheres containing flammable vapors or dusts.
- **G**--Gasoline-powered units having minimum acceptable safeguards against inherent fire hazards.
- **GS**--Gasoline-powered units that have additional safeguards to the exhaust, fuel, and electrical systems. These units may be used in some locations where the use of a G unit may not be considered suitable.
- **LP**--This unit is similar to the G unit, except that liquefied petroleum gas is used for fuel instead of gasoline.
- **LPS**--Liquefied petroleum gas-powered units that have additional safeguards to the exhaust, fuel, and electrical systems. These units may be used in some locations where the use of an LP unit may not be considered suitable.

Driving Skills Evaluation

B.1 Physical examination of lift truck (touch and tell)

The objective of this rating sheet is to ensure that employees understand the mechanics of the lift truck as well as all of those items that involve standard checking prior to driving the lift truck.

The operator should be familiar with the features of the lift truck. Evaluate by having the operator demonstrate and describe the following:

1. Proper use of tilt.
2. Proper use of raise and lower.
3. Proper use of horn.
4. Check for oil leaks.
5. Check mast chains.
6. Check tilt and lift cylinders for wear and/or leakage.
7. Check brakes.
8. Check tires and wheels.
9. Check hour meter.
10. Check scissors reach.
11. Check warning light.
12. Check rear view mirror.
13. Check battery retainer.
14. Check discharge indicator.
15. Check back up alarm.
16. Check hose and hose reel.
17. Check overhead guard's light.
18. Know capacity of lift truck.

B.2 Knowledge of safeguards within the facility

The operator is asked to identify many safety items at the dock and battery recharging area, as well as overall safety.

Dock
Wheel chocking
Dock plate
Trailer lighting
Condition of trailer floor
Keep clear of dock loading area
Be aware of signs
Correct height of empty pallets
Commercial battery rules
Fire and Safety
Location of extinguishers
How to use extinguisher
Type of extinguisher to use
Eye protection during banding

Battery Charging Area
Protective equipment
Acid neutralizing
MSDS
No smoking
Plug/unplug procedures
Clean-up procedures
Eyewash station

Personal Safety
Use of eye protection
during banding operations

B.3 Operating Skills Evaluation

Determine the operating skills of employees by making a full evaluation while they are driving the lift truck.

1. Did the operator pull forward toward the designated section of racking without endangering anyone?
2. Did the operator place the forks under the pallet properly?
3. Did the operator raise or tilt the load properly?
4. Did any part of the container strike any section of racking while removing the pallet?
5. Did the operator lower the pallet before moving or backing out? (Don't drive and lower the pallets at the same time.)
6. Did the operator drive at a safe speed?
7. Did the operator slow down or stop at cross aisles?
8. Did the operator sound his/her horn at blind intersections?
9 Did the operator pull into the racking area properly to place the pallet back in the racking?
10. Did the operator strike any racking on the way up or going into the rack?
11. Did the operator back out and lower his/her forks before moving?
12. Did the operator always look behind before backing up?
13. Was the operator wearing protective equipment?
14. Did the operator drive around the block of wood or obstacle on the floor, or did he/she get out of the truck and remove it?
15. Did the operator set the load flat on the floor before getting out of the truck?
16. Did the operator put on a hardhat before getting out of the truck?
17. Did the operator perform any moves that were potentially dangerous?

Powered Industrial Trucks Safety Checklist

This safety checklist will help employees and supervisors follow minimal safety practices. This list is not meant to be comprehensive nor is it meant to form part of any official self-assessment practice. Where appropriate, local safety offices and supervisors are encouraged to add to these checklists. Relevant references are noted after each question. These regulations apply only to installations or equipment used on temporary and permanent job sites.

General	OK	Action Needed
Do industrial trucks acquired after Feb. 15, 1972 meet the design requirements in "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969?" **29 CFR 1910.178 (a) (2)**	-----	----------
Has the manufacturer provided written approval for modifications that affect the capacity and safety operations of the equipment? **29 CFR 1910.178 (a) (4)**	-----	----------
Do industrial trucks have labels designating approval for use in various hazardous and/or nonhazardous locations? **29 CFR 1910.178 (a) (3) and (7)**	-----	----------
Designations		
Are supervisors and procurers of equipment aware of the eleven designations of industrial trucks or tractors (D, DS, DY, E, ES, EE, EX, G, GS, LP, and LS)? **29 CFR 1910.178 (b)**	-----	----------
Designated Use of Requirements		
Are supervisors and operators knowledgeable about the use of industrial trucks in various locations? **29 CFR 1910.178 (c) (1)**	-----	----------
Fuel Handling and Storage Requirements		
Is the storage and handling of liquid fuels in accordance with NFPA Flammable and Combustible Liquids Code (NFPA No. 58-1969)? **29 CFR 1910.178 (f) (1)**	-----	----------

Is the storage and handling of liquefied petroleum gas fuel in accordance with NFPA Storage and handling of Liquefied Petroleum Gases (NFPA No. 58-1969)? **29 CFR 1910.178 (f) (2)**	-----	----------
Changing and Charging Storage Batteries		
Are battery-charging installations located in areas designated for that purpose? **29 CFR 1910.178(g) (1)**	-----	----------
Are facilities provided for flushing and neutralizing spilled electrolyte? **29 CFR 1910.178 (g) (2)**	-----	----------
Are facilities provided for adequate ventilation for dispersal of fumes from gassing batteries? **29 CFR 1910.178 (g) (2)**	-----	----------
Is proper handling equipment (conveyor and hoists) provided for handling batteries? **29 CFR 1910.178 (g) (4)**	-----	----------
Is a carbon filter or siphon provided for handling electrolyte? **29 CFR 1910.178 (g) (6)**	-----	----------
Is care taken to ensure that vent caps are functioning when charging batteries?	-----	----------
Note: The battery (or compartment) cover(s) shall be open to dissipate heat. **29 CFR 1910.178 (g) (9)**		
Is smoking prohibited in the charging area? **29 CFR 1910.178 (g) (10)**	-----	----------
Are precautions taken to prevent open flames, sparks, or electric arcs in battery-charging areas? **29 CFR 1910.178 (g) (11)**	-----	----------
Are tools and other metallic objects kept away from the tops of uncovered batteries? **29 CFR 1910.178 (g) (12)**	-----	----------
Dockboards (bridge plates)		
Are portable and powered dockboards strong enough to carry the load imposed on them? **29 CFR 1910.30 (a) (i)**	-----	----------

Are portable dockboards secured in position, either by being anchored or equipped with devices that will prevent slippage? ----- ----------
29 CFR 1910.30 (a) (2)

Are handholds or other effective means provided on portable dockboards to ensure safe handling? ----- ----------
29 CFR 1910.30 (a) (4)

Is positive protection provided to prevent railroad cars from being moved while dockboards or bridge plates are in position? ----- ----------
29 CFR 1910.30 (a) (5)

Trucks and Railroad Cars

Do trucks have positive protection to prevent them from moving during loading or unloading? ----- ----------
29 CFR 1910.178 (k) (1)

Are wheel stops or other recognized positive protection provided to prevent railroad cars from moving during loading or unloading? ----- ----------
29 CFR 1910.178 (k) (2)

Are fixed jacks available to support a semi-trailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor? ----- ----------
29 CFR 1910.178 (k)(3)

Operator Training

The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph. ----- ----------
29 CFR 1910.178 (l)

Truck Operations

Is it prohibited for a person to stand or pass under the elevated portion of any truck, whether loaded or empty? ----- ----------
29 CFR 1910.178 (m) (2)

Are unauthorized personnel prohibited from riding on powered industrial trucks? ----- ----------
29 CFR 1910.178 (m) (3)

Is it prohibited for arms or legs to be placed between the uprights of the mast or outside the

running lines of a truck? ----- ----------
29 CFR 1910.178 (m) (4)

Is it required for load-engaging means to be fully lowered, controls neutralized, power shut off, and brakes set when a powered industrial truck is left unattended? ----- ----------
29 CFR 1910.178 (m) (5) (i)

Is it required to maintain a safe distance from the edge of ramps or platforms while on any elevated dock, platform, or freight car? ----- ----------
29 CFR 1910.178(m) (6)

Is an overhead guard used as protection against falling objects? ----- ----------
29 CFR 1910.178 (m) (9)

Is a load backrest extension used whenever necessary to minimize the possibility of the load or part of it from falling backward? ----- ----------
29 CFR 1910.178 (m) (10)

Are only approved industrial trucks used in hazardous locations? ----- ----------
29 CFR 1910.178 (m) (11)

Traveling

Is it required that all traffic regulations be observed, including authorized plant speed limits? ----- ----------
29 CFR 1910.178 (n) (1)

Is it required to yield the right of way to ambulances, fire trucks, or other vehicles in emergency situations? ----- ----------
29 CFR 1910.178 (n) (2)

Is it required that drivers not pass other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations? ----- ----------
29 CFR 1910.178 (n) (3)

Is it required that drivers slow down and sound the horn at cross aisles and other locations where vision is obstructed? ----- ----------
29 CFR 1910.178 (n) (4)

Is it required that railroad tracks shall be crossed diagonally, wherever possible? ----- ----------
29 CFR 1910.178 (n) (5)

Is it required that when ascending or descending grades that exceed 10 percent loaded trucks be

driven with the load upgrade? ----- ----------
29 CFR 1910.178(n) (7) (i)

Is it required that on all grades the load and load-engaging means be tilted back, if applicable, and raised only as far as necessary to clear the road surface? ----- ----------
29 CFR 1910.178 (n) (7)(iii)

Is it required that under all travel conditions the truck be operated at a speed that will permit it to stop in a safe manner? ----- ----------
29 CFR 1910.178 (n) (8)

Is stunt driving and horseplay prohibited? ----- ----------
29 CFR 1910.178 (n) (9)

Are dockboards or bridge plates properly secured before they are driven over? ----- ----------
29 CFR 1910.178 (n) (11)

Is it required that elevators be approached slowly, and then entered squarely after the elevator car is properly leveled? ----- ----------
29 CFR 1910.178 (n) (12)

Is it required that motorized hand trucks enter elevators or other confined areas with load end forward? ----- ----------
29 CFR 1910.178 (n) (13)

Loading

Are drivers instructed that only stable or safely arranged loads be handled? ----- ----------
29 CFR 1910.178 (o) (1)

Are drivers instructed that only loads within the rated capacity of the truck shall be handled? ----- ----------
29 CFR 1910.178 (o) (2)

Is a load-engaging means placed under the load as far as possible? ----- ----------
29 CFR 1910.178 (o) (5)

Are drivers required to use extreme care when tilting the load forward or backward, particularly when high tiering? ----- ----------
29 CFR 1910.178 (o) (6)

Operation of the Truck

Are personnel instructed that fuel tanks not be filled while the engine is running? ----- ----------
29 CFR 1910.178 (p) (2)

Is it required that spillage of oil or fuel be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting the engine? ----- ----------

29 CFR 1910.178 (p) (3)

Is it prohibited for a truck to be operated with a leak in the fuel system until the leak has been corrected? ----- ----------
29 CFR 1910.178 (p) (4)

Is it prohibited for open flames to be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks? ----- ----------
29 CFR 1910.178 (p) (5)

Maintenance of Industrial Trucks

Is it required that no repairs be made in Class I, II, and III locations? ----- ----------
29 CFR 1910.178 (q) (2)

Is it required that repairs to the fuel and ignition systems of industrial trucks, which involve fire hazards, be conducted only in locations designated for such repairs? ----- ----------
29 CFR 1910.178 (q) (3)

Is it required that trucks in need of repairs to the electrical system have the battery disconnected before such repairs are made? ----- ----------
29 CFR 1910.178 (q) (4)

Is it required that industrial trucks not be altered without the manufacturer's approval? ----- ----------
29 CFR 1910.178 (q) (6)

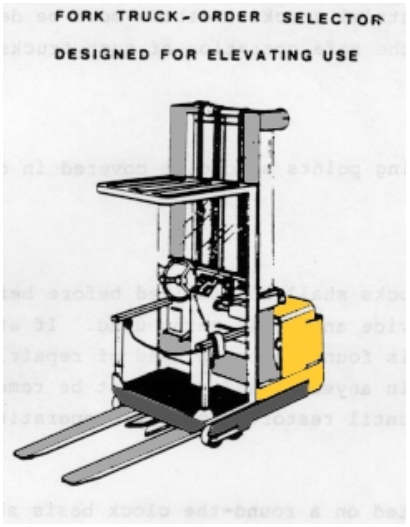
Is it required that industrial trucks be examined before being placed in service? ----- ----------
29 CFR 1910.178 (q) (7)

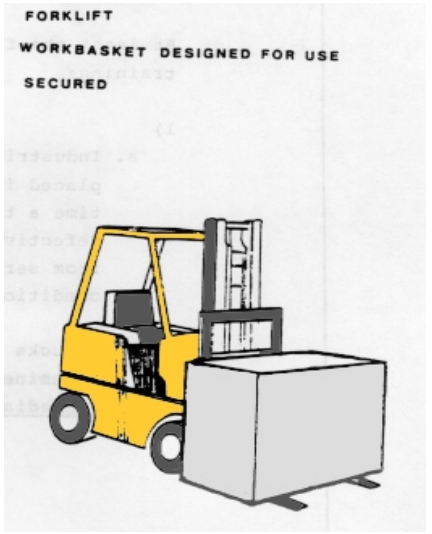
Is it required that water mufflers be filled daily or as frequently as necessary to prevent depletion of the water supply below 75 percent of the filled capacity? ----- ---------
29 CFR 1910.178 (q) (8)

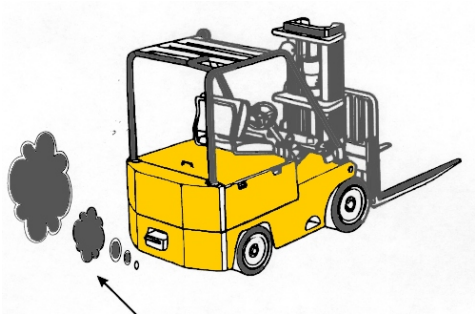
Is it required that vehicles with mufflers and screens or other parts that may become clogged not be operated while such screens or parts are clogged? ----- ---------
29 CFR 1910.178 (q) (8)

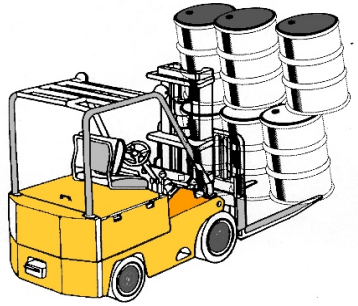
Is it required that any vehicle that emits hazardous sparks or flames from the exhaust system be immediately removed from service and not returned to service until the cause for the emission of such sparks and flames has been eliminated? ----- ---------
29 CFR 1910.178 (q) (8)

Is it required that when the temperature of any part of any truck is found to exceed its normal operating temperature, thus creating a hazardous condition, the vehicle be removed from service and not be returned to service until the cause for such overheating has been eliminated? ----- ---------
29 CFR 1910.178 (q) (9)

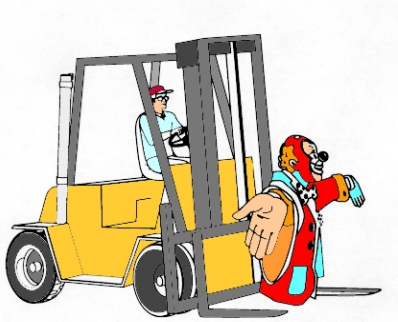




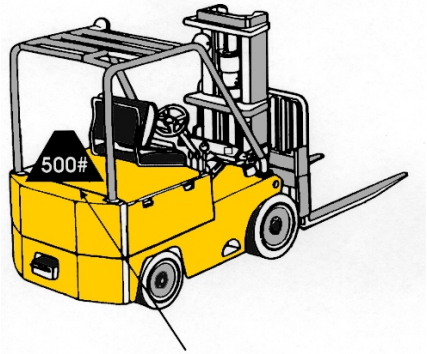




178 (o)(1) Unstable Loads



178(m)(3)



178 (a)(4)Modifications